Assignment 5

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Q1-Explain the difference between preemptive and nonpreemptive scheduling.

Preemptive Scheduling CPU control OS can take CPU from a running process, the Response Time Faster for high-priority tasks and is Higher for low-priority processes

Nonpreemptive Scheduling CPU Process holds CPU until it finishes or waits the Response time Slower for high-priority tasks while it is lower but can still occur in priority scheduling

Q2-Consider the following set of processes, with the length of the CPU burst time given in milliseconds:

Process               Burst Time                       Priority

P1                         2                                    2

P2                           1                                    1

P3                         8                                     4

P4                         4                                     2

P5                         5                                     3

The processes are assumed to have arrived in the order P1 , P2 , P3 , P4 , P5 , all at time 0.

1. Draw four Gantt charts that illustrate the execution of these processes using the following scheduling algorithms: FCFS, SJF, non-preemptive priority (a larger priority number implies a higherpriority), and RR (quantum = 2).

FCFS Gantt Chart

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 |

SJF

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 |  |

Priority Scheduling

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 |

Round Robin (Quantum =2)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |

1. What is the turnaround time of each process for each of the scheduling algorithms in part a?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Process | FCFS | SJf | Priority WT | RR WT |
| P1 | 2 | 1 | 8 | 2 |
| P2 | 3 | 3 | 13 | 3 |
| P3 | 11 | 7 | 17 | 20 |
| P4 | 15 | 12 | 19 | 13 |
| P5 | 20 | 20 | 20 | 18 |

1. What is the waiting time of each process for each of these scheduling algorithms?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Process | FCFS | SJf | Priority WT | RR WT |
| P1 | 0 | 0 | 0 | 0 |
| P2 | 2 | 1 | 8 | 2 |
| P3 | 3 | 3 | 13 | 12 |
| P4 | 11 | 7 | 17 | 9 |
| P5 | 15 | 12 | 19 | 13 |

d. Which of the algorithms results in the minimum average waiting time (over all processes)?

**Shortest Job First (SJF) algorithm** results in the minimum average waiting time among all processes

Q3-Consider two processes, P1 and P2 , where p1 = 50, t1 = 25, p2 = 75, and t2 = 30.

1. Can these two processes be scheduled using rate-monotonic scheduling? Illustrate your answer using a Gantt chart such as the ones in Figure 5.21–Figure 5.24.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 |

(P1)

1. Illustrate the scheduling of these two processes using earliest-deadline-first (EDF) scheduling

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 |

(P1) (P2) (P3) (P4)